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Brief 66-10395

NASA TECH BRIEF

Composite Gaskets Are Compatible with Liquid Oxygen, Resist Compression Set

The problem:

Commercially available fluorocarbon polymers, which have been used as gaskets for liquid oxygen because of their sealing properties and chemical inertness toward this vigorous oxidizing agent, are subject to cold flow under compression at room temperature (during standby periods). Such gaskets will consequently extrude from the flange joints and cause the seals to fail. An investigation was therefore conducted in an effort to eliminate the undesirable cold flow characteristic by reinforcing the fluorocarbon polymers with inorganic fibers which are not attacked by liquid oxygen.

The solution:

Fabricate gaskets by laminating the fluorocarbon polymers with fiber glass cloth. The fabrication process is controlled so that the fibers are not completely impregnated with the polymer. The resultant gaskets have a low compression set and their flexibility is not subject to drastic change at the temperature of liquid oxygen.

How it's done:

Twelve plies of glass cloth or asbestos paper are alternated with 13 plies of a 5-mil film of a copolymer of tetrafluoroethylene and hexafluoropropylene. The laminate is bonded at a pressure of 300 psi at 700°F for 15 minutes and then allowed to cool in the press. Gaskets are cut from the cooled laminate, using an appropriate die.

Notes:

1. It may be feasible to use composite gaskets incorporating other inorganic fabrics, including fabrics woven from metal wire, and polymers such as polytetrafluorethylene, polyvinylidene fluoride, and polychlorotrifluoroethylene.
2. Inquiries concerning this invention may be directed to:

   Technology Utilization Officer
   Marshall Space Flight Center
   Huntsville, Alabama 35812
   Reference: B66-10395

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: Rex B. Gosnell
of Whittaker Corporation
under contract to
Marshall Space Flight Center
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Category 03